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## EDUCATION

- **09/2014 – 06/2020 Ph.D.** in Electronic and Computer Engineering,  
**The Hong Kong University of Science and Technology (HKUST)**, Hong Kong  
Supervisor: Prof. Hoi Sing KWOK & Prof. Man WONG
- **09/2010 – 06/2014 B.Sc.** in Opto-Information Science and Technology (with Honors),  
**Huazhong University of Science and Technology (HUST)**, Wuhan, China

## RESEARCH INTERESTS

**Back-end-of-line (BEOL)** compatible emerging (e.g., amorphous oxide semiconductor) **nanoelectronics** and related processing technologies **for heterogeneous/monolithic 3D integration, neuromorphic/in-memory computing, and information displays**. All are committed to advancing **integrated circuits for artificial intelligence**.

## AWARDS & HONORS

1. **Best Theme Poster Award**, *the 1<sup>st</sup> Annual Review of the Center for Heterogeneous Integration of Micro Electronic Systems (CHIMES, one of the SRC/DARPA JUMP 2.0 centers)*, 2023
2. **Member**, *SID Display Future Star Committee*, 2023
3. **Distinguished Paper Award**, *Society for Information Display's Display Week*, 2021
4. **Young Leader Award**, *SID China*, 2021
5. **Best Paper Award**, *Young Leaders in Displays (HK) and Postgraduate Workshop*, 2021
6. Student Travel Grant, *Society for Information Display's Display Week*, 2019
7. **Academic Award for PhD Students**, *School of Engineering, HKUST*, 2019
8. **Best Poster Presentation Award**, *Postgraduate Workshop on Display Research*, 2018
9. Student Travel Grant, *Society for Information Display's Display Week*, 2018
10. **Distinguished Poster Award**, *International Display Manufacturing Conference*, 2017
11. **Best Oral Presentation Award**, *Postgraduate Workshop on Display Research*, 2016
12. **PG Workshop Distinguished Paper Award**, *International Display Manufacturing Conference*, 2015
13. Full postgraduate scholarship, *HKUST*, 2014-2020
14. Outstanding Graduate, *HUST*, 2014
15. Merit Student, *HUST*, 2013
16. Undergraduate Scientific and Technological Innovation Activist, *HUST*, 2012

## RESEARCH EXPERIENCE

- **09/2022 – present School of Electrical and Computer Engineering, Georgia Institute of Technology (GaTech), Atlanta, USA**  
**Supervisor:** Prof. Suman DATTA  
**Position:** Postdoctoral Fellow
- 1. **Amorphous oxide semiconductor (AOS) power transistors for on-chip voltage conversion**
  - a) Invented BEOL-compatible AOS power transistors for 12-volt operation.
  - b) Monolithically co-integrated depletion- and enhancement-mode AOS power transistors.

- c) Developed dual-gate AOS power transistors with boosted performance and enhanced reliability.
  - d) Fabricated high-breakdown-voltage superlattice MIM capacitors based on laminate fluorites.
  - e) Demonstrated on-chip switched-capacitor DC-DC converters for 12V-to-6V step-down conversion for heterogeneous 3D integrated transformer accelerators.
- 2. AOS access and ferroelectric transistors for Computing in-Memory (CiM) Hardware**
- a) Improved reliability of AOS transistors with a dual-gate structure for memory access.
  - b) Explored ALD technique as mobility-reliability boosters for AOS transistors.
  - c) Developed asymmetric dual-gate AOS ferroelectric field-effect transistors (FeFETs) with improved area efficiency and suppressed read/write disturbance in CiM bit cells.
- **09/2021 – 08/2022 School of Materials Engineering, Purdue University, West Lafayette, USA**  
**Supervisor:** Prof. Shriram RAMANATHAN  
**Position:** Postdoctoral Researcher
- 1. Homotypic Mott neuromorphic electronics enabled by selective-area doping technique**
- a) Reported the first two-terminal VO<sub>2</sub>-based artificial synapses.
  - b) Implemented selective-area extremely heavy H doping in VO<sub>2</sub>-based neural memories for building homotypic spiking neural IC hardware.
- 2. Hydrogenated Mott bits for energy-efficient probabilistic computing**
- a) Developed sub-nm scale mapping technique of hydrogen dopant distribution in VO<sub>2</sub>.
  - b) Demonstrated partially hydrogenated VO<sub>2</sub>-based probabilistic bit (p-bit) generators.
- **07/2020 – 08/2021 State Key Laboratory of Advanced Displays and Optoelectronics Technologies (SKL of ADT), HKUST, Hong Kong**  
**Supervisor:** Prof. Hoi Sing KWOK & Prof. Ching Wan TANG  
**Position:** Postdoctoral Research Associate (in HK Research Talent Hub)
- 1. Research on AOS thin-film transistors (TFTs)**
- a) Developed cost-effective fluorination in-packaging (FiP) technique for AOS TFT reliability enhancement at a low thermal processing budget.
  - b) Implemented low-voltage ( $\leq 1$  V) ICs with all-oxide TFTs for wearable electronics.
- 2. Silicon nitride shadow masking for ultra-high-resolution OLED displays**
- a) Develop micron-thin self-tensioned (5000 ppi) corrugated silicon nitride masks (SiNMs).
  - b) Demonstrated 3000-ppi 3-inch full-color OLED pixel patterns using the SiNMs.
- **09/2014 – 06/2020 SKL of ADT, HKUST, Hong Kong**  
**Supervisor:** Prof. Hoi Sing KWOK & Prof. Man WONG  
**Position:** Ph.D. Candidate
- 1. Hybrid-phase indium-tin-zinc oxide (hp-InSnZnO) TFT technology**
- a) Designed hp-InSnZnO channels by co-design of element composition and crystal morphology.
  - b) Developed hybrid PECVD-SiO<sub>2</sub> stacks as gate insulators with enhanced dielectric quality.
  - c) Reported gate electrode's gas permeability as an effective knob for threshold voltage modulation.
  - d) Fabricated high-performance hp-InSnZnO TFTs with diverse (self-aligned, vertical, etc.) structures.
  - e) Extracted compact models of the hp-InSnZnO TFTs.
  - f) Prototyped a 2.2-inch 861ppi AMOLED panel with the hp-InSnZnO TFTs.
  - g) Implemented digital and analog ICs applicable to sensor interfaces.
- 2. Bridged-grain (BG) poly-Si TFTs using laser interference lithography (LIL)**
- a) Built a LIL system for submicron BG strips patterning.
  - b) Improved electrical characteristics of poly-Si TFTs by using LIL-defined BG structure.
- 3. Large-area few-layered MoS<sub>2</sub> film deposition via magnetron sputtering**
- a) Sputtered high-quality few-layer MoS<sub>2</sub> films on 4-inch Si wafers.

- b) Characterized the few-layer MoS<sub>2</sub> films using spectroscopic and microscopy technologies.
- c) Fabricated the few-layer MoS<sub>2</sub> transistors.

#### 4. Development of new-generation micro-LED displays

- a) Investigated selective mass transfer and miniaturization techniques for micro-LED pixels.
- b) Assembled micro-LED pixels on active-matrix backplanes with AOS TFTs.

#### ▪ 05/2011 – 06/2014 Wuhan National Laboratory for Optoelectronics (WNLO), HUST, China

**Mentor:** Prof. Jun ZHOU & Prof. Zhonglin WANG

**Position:** Undergraduate Research Assistant

- 1. Fabricated self-cleaning flexible infrared sensors with carbon nanoparticles.
- 2. Developed three-dimensional ZnO porous films for self-cleaning ultraviolet detectors.
- 3. Demonstrated broadband photodetectors based on ZnO nanowire array and PbS quantum dots.

### PROFESSIONAL ACTIVITIES

#### ▪ Participated Funding Programs

- 1. 01/2023 – 12/2027, “Amorphous Oxide Semiconductor for Integrated Power Delivery & Conversion”, CHIMES-T2-3136.007, USD 1,250,000, funded by SRC/DARPA Joint University Microelectronics Program (JUMP) 2.0 Program.
- 2. 03/2022 – 02/2024, “Research on Thin Film Encapsulation Technology for Flexible OLED Devices”, GHP/006/20GD, HKD 1,096,250.00, funded by The Innovation and Technology Commission (ITC).
- 3. 11/2020 – 10/2022, “Flexible Metal-oxide Backplane Technology for RGB-Color Conversion OLED Displays”, GHP/013/19SZ, HKD995,999.47, funded by The Hong Kong Government.
- 4. 11/2019 – 4/2022, “Flexible photodetector array with integrated electronics based on metal-oxide”, SZSTI20EG15, HKD 1,924,371.93, funded by Shenzhen Sci & Tech Innovation Committee (SZSTI).
- 5. 09/2019 – 08/2021, “EMMO-Structure Metal-Oxide Thin-Film Transistor for the Next-Generation AMOLED Display”, GHP/007/18GD, HKD 1,276,700.00, funded by The Innovation and Technology Commission (ITC).
- 6. 04/2019 – 03/2020, “Study on InSnZnO Thin Film Transistors and its Active-Matrix Array for High Resolution AMOLED Displays”, GZSTI17EG02, HKD 283,254.02, funded by Guangzhou Municipal Sci. & Tech. Bureau.
- 7. 06/2017 – 05/2019, “Applications of Novel Metal-Oxide Thin-Film Transistor to Flat Panel Displays and Internet of Things (IoT)”, IGN16EG17, HKD 200,000, funded by the Hong Kong University of Science and Technology.
- 8. 07/2013 – 01/2049, “State Key Laboratory on Advanced Displays and Optoelectronics Technologies (HKUST)”, ITC-PSKL12EG02, HKD 98,750,000.00, funded by The Innovation and Technology Commission (ITC).
- 9. 01/2012 – 12/2016, “Challenges in Organic Photo-Voltaic and Light-Emitting Diodes – A Concerted Multi-Disciplinary and Multi-Institutional Effort”, T23-713/11-1, HKD 5,000,000, funded by The Hong Kong Government.
- 10. Other projects supported by Samsung Electronics, EMD Electronics, etc.

#### ▪ Invited Talks

- 1. “BEOL-Compatible On-Chip DC-DC Converter” at *2024 IEEE International Interconnect Technology Conference (IITC)*, San Jose, USA, 06/2024.
- 2. “Amorphous Oxide Semiconductors for Monolithic 3D Integrated Circuits”, on *2024 IEEE Symposium on VLSI Technology & Circuits*, Honolulu, USA, 06/2024.
- 3. “Fluorinated Metal Oxide Thin-Film Transistors with Low Process Thermal Budgets” at *2023 International Conference on Display Technology*, Nanjing, China, 03/2023.
- 4. “Hybrid-Phase Metal Oxide Thin-Film Transistor Technology” at *Young Leader Conference of ICDT*

2021, Beijing, China, 06/2021.

5. "Hybrid-Phase Metal Oxide Thin-Film Transistors and their Applications" at *Shanghai University League's Forum for International Young Scholars*, Shanghai, China, 05/2020.

- **Organized Conferences/Workshops**

1. TPC, *2024 National Nanotechnology Coordinated Infrastructure (NNCI) Etch Symposium*, Atlanta, USA, 2024.
2. Program committee member, *Cross-Strait Postgraduate Workshop on Display Research*, Guangzhou, China, 2016
3. Student helper, *16<sup>th</sup> International Conference on Ferroelectric Liquid Crystals*, Hong Kong, 2016
4. Student helper, *6<sup>th</sup> International Photonics and Optoelectronics Meeting*, Wuhan, China, 2013

- **Professional Affiliations**

1. Member, *Institute of Electrical and Electronics Engineers (IEEE)*
2. Member, *Society for Information Display (SID)*

- **Reviewer**

IEEE Electron Device Letters, IEEE Transactions on Electron Devices, Applied Physics Letters, Journal of the Society for Information Display, Scientific Reports, Thin Solid Films, Physical Review Applied, etc.

- **Editorial Board**

Rare Metals

- **Teaching Assistant**

1. Fundamentals of Photovoltaic and Renewable Energy (ELEC 4530), HKUST, 02/2018-06/2018
2. Digital Circuits and Systems (ELEC 2200), HKUST, 09/2015-06/2016
3. Synthesis and Characterization of Optoelectronic Materials, HUST, 09/2013-01/2014

## **PUBLICATIONS** (citation: 970+, H-index: 16, source: [Google Scholar](#))

- **Representative Publications**

1. **Deng, Sunbin**; Yu, Haoming; Park, Tae Joon; Islam, A. N. M. Nafiul; Manna, Sukrit; Pofelski, Alexandre; Wang, Qi; Zhu, Yimei; Sankaranarayanan, Subramanian K. R. S.; Sengupta, Abhronil; Ramanathan, Shriram. "Selective area doping for Mott neuromorphic electronics", *Science Advances*, 9.11 (2023): eade4838.
2. **Deng, Sunbin**; Shin, Jaewon; Zhang, Chengyang; Park, Hyeonwoo; Phadke, Omkar; Kwak, Jungyou; Yu, Shimeng; Datta, Suman. "Boosted Performance and Enhanced Reliability of BEOL-Compatible Dual-Gate Oxide Power Transistors for On-Chip DC-DC Voltage Conversion", *2024 IEEE International Electron Devices Meeting (IEDM)*, San Francisco, USA, Dec. 2024.
3. **Deng, Sunbin**; Kwak, Jungyou; Lee, Junmo; Chakraborty, Dyutimoy; Shin, Jaewon; Phadke, Omkar; Kirtania, Sharadindu Gopal; Zhang, Chengyang; Aabrar, Khandker Akif; Yu, Shimeng; Datta, Suman. "Demonstration of On-Chip Switched-Capacitor DC-DC Converters using BEOL Compatible Oxide Power Transistors and Superlattice MIM Capacitors", *2024 IEEE Symposium on VLSI Technology & Circuits*, Honolulu, USA, June 2024.
4. **Deng, Sunbin**; Kwak, Jungyou; Lee, Junmo; Aabrar, Khandker Akif; Kim, Tae-Hyeon; Choe, Gihun; Kirtania, Sharadindu Gopal; Zhang, Chengyang; Li, Wantong; Phadke, Omkar; Yu, Shimeng; Datta, Suman. "BEOL Compatible Oxide Power Transistors for On-Chip Voltage Conversion in Heterogenous 3D (H3D) Integrated Circuits", *2023 IEEE International Electron Devices Meeting (IEDM)*, San Francisco, USA, Dec. 2023.
5. **Deng, Sunbin**; Zhong, Wei; Dong, Shou-Cheng; Chen, Rongsheng; Li, Guijun; Zhang, Meng; Yeung, Fion Sze Yan; Wong, Man; Kwok, Hoi-Sing. "Thermal Budget Reduction in Metal Oxide Thin-Film

Transistors via Planarization Process", *IEEE Electron Device Letters*, 42.2 (2021): 180-183.

▪ **Book Chapters**

1. Zhang, Meng; **Deng, Sunbin**; Yan, Yan; Wong, Man; Kwok, Hoi-Sing. "Fundamentals of Metal-Oxide Thin-Film Transistors", in *Semiconducting metal oxide thin-film transistors*, IOP Publishing, Bristol, UK. DOI: 10.1088/978-0-7503-2556-1ch2.

▪ **Journal Articles** (50+ articles in total including 21 articles as first/corresponding author)

1. **Deng, Sunbin**; Kwak, Jungyoun; Lee, Junmo; Chakraborty, Dyutimoy; Shin, Jaewon; Phadke, Omkar; Kirtania, Sharadindu Gopal; Zhang, Chengyang; Aabrar, Khandker Akif; Yu, Shimeng; Datta, Suman. "Monolithic Switched-Capacitor DC-DC Voltage Converters using BEOL-Compatible Oxide Power Transistors and Superlattice MIM Capacitors", *IEEE Transactions on Electron Devices*, 71.12 (2024): 7999-8006.
2. **Deng, Sunbin**; Park, Tae Joon; Yu, Haoming; Saha, Arnob; Islam, A. N. M. Nafiul; Wang, Qi; Sengupta, Abhronil; Ramanathan, Shriram. "Hydrogenated VO<sub>2</sub> Bits for Probabilistic Computing", *IEEE Electron Device Letters*, 44.10 (2023): 1776-1779.
3. **Deng, Sunbin**; Yu, Haoming; Park, Tae Joon; Islam, A. N. M. Nafiul; Manna, Sukrit; Pofelski, Alexandre; Wang, Qi; Zhu, Yimei; Sankaranarayanan, Subramanian K. R. S.; Sengupta, Abhronil; Ramanathan, Shriram. "Selective area doping for Mott neuromorphic electronics", *Science Advances*, 9.11 (2023): eade4838.
4. Park, Tae Joon\*; **Deng, Sunbin**\*; Manna, Sukrit; Islam, A. N. M. Nafiul; Yu, Haoming; Yuan, Yifan; Fong, Dillon D.; Chubykin, Alexander A.; Sengupta, Abhronil; Sankaranarayanan, Subramanian K. R. S.; Ramanathan, Shriram. "Complex oxides for brain-inspired computing: A review", *Advanced Materials* (2022): 2203352. (**\*Equal contribution**)
5. **Deng, Sunbin**; Dong, Shou-Cheng; Chen, Rongsheng; Zhong, Wei; Li, Guijun; Zhang, Meng; Yeung, Fion Sze Yan; Wong, Man; Kwok, Hoi-Sing. "A Cost-Effective Fluorination Method for Enhancing the Performance of Metal Oxide Thin-Film Transistors", *Journal of the Society for Information Display*, 29.5 (2021): 318-327. (**Additional cover**)
6. **Deng, Sunbin**; Zhong, Wei; Dong, Shou-Cheng; Chen, Rongsheng; Li, Guijun; Zhang, Meng; Yeung, Fion Sze Yan; Wong, Man; Kwok, Hoi-Sing. "Thermal Budget Reduction in Metal Oxide Thin-Film Transistors via Planarization Process", *IEEE Electron Device Letters*, 42.2 (2021): 180-183.
7. Yin, Xuemei\*; **Deng, Sunbin**\*; Li, Guoyuan; Zhong, Wei; Chen, Rongsheng; Li, Guijun; Yeung, Fion Sze Yan; Wong, Man; Kwok, Hoi Sing. "Low Leakage Current Vertical Thin-Film Transistors with ITO-stabilized ZnO Channel", *IEEE Electron Device Letters*, 41.2 (2020): 248-251. (**\*Equal contribution**)
8. **Deng, Sunbin**; Chen, Rongsheng; Li, Guijun; Zhang, Meng; Yeung, Fion Sze Yan; Wong, Man; Kwok, Hoi-Sing. "Gate Insulator Engineering in Top-Gated Indium-Tin-Oxide-Stabilized ZnO Thin-Film Transistors", *IEEE Electron Device Letters*, 40.7 (2019): 1104-1107.
9. Xu, Yuming\*; **Deng, Sunbin**\*; Wu, Zhaohui; Li, Bin; Qin, Yuning; Zhong, Wei; Chen, Rongsheng; Li, Guijun; Wong, Man; Kwok, Hoi Sing. "The Implementation of Fundamental Digital Circuits With ITO-Stabilized ZnO TFTs for Transparent Electronics", *IEEE Transactions on Electron Devices*, 65.12 (2018): 5395-5399. (**\*Equal contribution**)
10. Zhong, Wei\*; **Deng, Sunbin**\*; Wang, Kai; Li, Guijun; Li, Guoyuan; Chen, Rongsheng; Kwok, Hoi-Sing. "Feasible route for a large area few-layer MoS<sub>2</sub> with magnetron sputtering", *Nanomaterials*, 8.8 (2018): 590. (**\*Equal contribution**)
11. **Deng, Sunbin**; Chen, Rongsheng; Li, Guijun; Zhang, Meng; Xia, Zhihe; Wong, Man; Kwok, Hoi-Sing. "Threshold voltage adjustment in hybrid-microstructural ITO-stabilized ZnO TFTs via gate electrode engineering", *IEEE Electron Device Letters*, 39.7 (2018): 975-978.

12. **Deng, Sunbin**; Chen, Rongsheng; Li, Guijun; Xia, Zhihe; Zhang, Meng; Zhou, Wei; Wong, Man; Kwok, Hoi-Sing. "Hybrid-Phase Microstructural ITO-Stabilized ZnO TFTs with Self-Aligned Coplanar Architecture", *IEEE Electron Device Letters*, 38.12 (2017): 1676-1679.
13. **Deng, Sunbin**; Chen, Rongsheng; Li, Guijun; Xia, Zhihe; Zhang, Meng; Zhou, Wei; Wong, Man; Kwok, Hoi-Sing. "Investigation of high-performance ITO-stabilized ZnO TFTs with hybrid-phase microstructural channels", *IEEE Transactions on Electron Devices*, 64.8 (2017): 3174-3182.
14. **Deng, Sunbin**; Chen, Rongsheng; Li, Guijun; Xia, Zhihe; Zhang, Meng; Zhou, Wei; Wong, Man; Kwok, Hoi-Sing. "High-performance staggered top-gate thin-film transistors with hybrid-phase microstructural ITO-stabilized ZnO channels", *Applied Physics Letters*, 109.18 (2016): 182105.
15. **Deng, Sunbin**; Chen, Rongsheng; Zhou, Wei; Ho, Jacob Yeuk Lung; Wong, Man; Kwok, Hoi-Sing. "Fabrication of high-performance bridged-grain polycrystalline silicon TFTs by laser interference lithography", *IEEE Transactions on Electron Devices*, 63.3 (2016): 1085-1090.
16. Li, Hui; **Deng, Sunbin**<sup>^</sup>; Xu, Yuming; Zhong, Wei; Luo, Dongxiang; Li, Guijun; Kwok, Hoi Sing; Chen, Rongsheng. "A Differential Ring Oscillator with Tail Current Source Control Scheme Using N-Type Oxide TFTs", *IEEE Transactions on Electron Devices*, 69.4 (2022): 1870-1875. (**^Corresponding author**)
17. Xu, Yuming; Wu, Zhaohui; Li, Bin; **Deng, Sunbin**<sup>^</sup>; Zhong, Wei; Li, Guijun; Luo, Dongxiang; Yeung, Fion Sze Yan; Kwok, Hoi Sing; Chen, Rongsheng. "Oxide TFT Frontend Amplifiers for Flexible Sensing Systems", *IEEE Transactions on Electron Devices*, 68.12 (2021): 6190-6196. (**^Corresponding author**)
18. Xu, Yuming; Zhong, Wei; Li, Bin; **Deng, Sunbin**<sup>^</sup>; Fan, Houbo; Wu, Zhaohui; Lu, Lei; Yeung, Fion Sze Yan; Kwok, Hoi-Sing; Chen, Rongsheng. "An Integrator and Schmitt Trigger Based Voltage-to-Frequency Converter Using Unipolar Metal-Oxide Thin Film Transistors", *IEEE Journal of the Electron Devices Society*, 9 (2021): 144-150. (**^Corresponding author**)
19. Fan, Houbo; Li, Guoyuan; **Deng, Sunbin**<sup>^</sup>; Xu, Yuming; Qin, Yuning; Liu, Yuan; Yeung, Sze Yan Fion; Wong, Man; Kwok, Hoi Sing; Chen, Rongsheng. "A High Gain Low-Noise Amplifier based on ITO-Stabilized ZnO Thin-Film Transistors", *IEEE Transactions on Electron Devices*, 67.12 (2020): 5537-5543. (**^Corresponding author**)
20. Xu, Yuming; Li, Bin; **Deng, Sunbin**<sup>^</sup>; Qin, Yuning; Fan, Houbo; Zhong, Wei; Liu, Yuan; Wu, Zhaohui; Yeung, Fion Sze Yan; Wong, Man; Kwok, Hoi Sing; Chen, Rongsheng. "A Novel Envelope Detector Based on Unipolar Metal-Oxide TFTs", *IEEE Transactions on Circuits and Systems II: Express Briefs*, 67.11 (2020): 2367-2371. (**^Corresponding author**)
21. Qin, Yuning; Li, Guoyuan; Xu, Yuming; Chen, Rongsheng; **Deng, Sunbin**<sup>^</sup>; Zhong, Wei; Wu, Zhaohui; Li, Bin; Li, Guijun; Yeung, Sze Yan Fion; Wong, Man; Kwok, Hoi-Sing. "Low-Power Design for Unipolar ITO-Stabilized ZnO TFT RFID Code Generator Using Differential Logic Decoder", *IEEE Transactions on Electron Devices*, 66.11 (2019): 4768-4773. (**^Corresponding author**)
22. Zhu, Guanming; Chen, Zhiying; Zhang, Meng; Lu, Lei; **Deng, Sunbin**; Wong, Man; Kwok, Hoi-Sing. "Reliability of indium-tin-zinc-oxide thin-film transistors under dynamic drain voltage stress", *Applied Physics Letters*, 125.2 (2024): 023505.
23. Yuan, Yifan; Kotiuga, Michele; Park, Tae Joon; Patel, Ranjan; Ni, Yuanyuan; Saha, Arnob; Zhou, Hua; Sadowski, Jerzy; Al-Mahboob, Abdullah; Yu, Haoming; Du, Kai; Zhu, Minning; **Deng, Sunbin**; Bisht, Ravindra; Lyu, Xiao; Wu, Chung-Tse; Ye, Peide; Sengupta, Abhronil; Cheong, Sang-Wook; Xu, Xiaoshan; Rabe, Karin; Ramanathan, Shriram. "Hydrogen-Induced Tunable Remanent Polarization in a Perovskite Nickelate", *Nature Communications*, 15.1 (2024): 4717.
24. Pofelski, Alexandre; Jia, Haili; **Deng, Sunbin**; Yu, Haoming; Park, Tae Joon; Manna, Sukriti; Chan, Maria K. Y.; Sankaranarayanan, Subramanian K. R. S.; Ramanathan, Shriram; Zhu, Yimei. "Sub-nanometer Scale Mapping of Hydrogen Doping in Vanadium Dioxide", *Nano Letters*, 24.6 (2024): 1974-1980.

25. Chen, Yayi; Liu, Yuan; **Deng, Sunbin**; Chen, Rongsheng; Zhang, Jianfeng; Kwok, Hoi-Sing; Zhong, Wei. "Low-frequency noise in InSnZnO thin film transistors with high-quality SiO<sub>2</sub> gate oxide stacks", *Applied Physics Letters*, 124.2 (2024): 023501.
26. Zhang, Meng; Jiang, Zhendong; **Deng, Sunbin**; Chen, Zhiying; Ma, Xiaotong; Tien, Ching-Ho; Chen, Lung-Chien; Wong, Man; Kwok, Hoi-Sing. "Hot Carrier Degradation Accompanied by Recovery in InSnZnO Thin-Film Transistors", *IEEE Electron Device Letters*, 44.7 (2023): 1124-1127.
27. Zhu, Guanming; Zhang, Meng; Jiang, Zhendong; Huang, Jinyang; Huang, Yuxiang; **Deng, Sunbing**; Lu, Lei; Wong, Man; Kwok, Hoi-Sing. "Significant Degradation Reduction in Metal Oxide Thin-Film Transistors via the Interaction of Ionized Oxygen Vacancy Redistribution, Self-Heating Effect, and Hot Carrier Effect", *IEEE Transactions on Electron Devices*, 70.8 (2023): 4198-4205.
28. Zhang, Jianfeng; Yao, Chuang; Liu, Xinhui; Ding, Ziyi; Liu, Yuan; Liu, Baoxing; **Deng, Sunbin**; Kwok, Hoi-Sing; Li, Guijun. "Controllable Transformation of 2D Perovskite for Multifunctional Sensing Properties", *The Journal of Physical Chemistry C*, 127.16 (2023): 7730-7739.
29. Chen, Zhiying; Zhang, Meng; **Deng, Sunbin**; Jiang, Zhendong; Yan, Yan; Han, Suting; Zhou, Ye; Wong, Man; Kwok, Hoi-Sing. "Effect of Moisture Exchange Caused by Low-Temperature Annealing on Device Characteristics and Instability in InSnZnO Thin-Film Transistors". *Advanced Materials Interfaces*, 9.14 (2022): 2102584. **(Inside back cover)**
30. Luo, Zhongming; Liu, Baoxing; Luo, Xi; Zheng, Ting; **Deng, Sunbin**; Chen, Rongsheng; Tian, Bingbing; Xu, Ping; Kwok, Hoi-Sing; Li, Guijun. "A Generic Protocol for Highly Reproducible Manufacturing of Efficient Perovskite Light-Emitting Diodes Using In-Situ Photoluminescence Monitoring", *Advanced Materials Technologies*, 7.5 (2022): 2100987.
31. Jiang, Zhendong; Zhang, Meng; **Deng, Sunbing**; Yang, Yuyang; Wong, Man; Kwok, Hoi-Sing. "Evaluation of Positive-Bias-Stress-Induced Degradation in InSnZnO Thin-Film Transistors by Low Frequency Noise Measurement", *IEEE Electron Device Letters*, 43.6 (2022): 886-889.
32. Yan, Huibo; Huang, Jincheng; Zhang, Xiaohui; Wang, Ming; Liu, Jun; Meng, Chunfeng; **Deng, Sunbin**; Lu, Lei; Xu, Ping; Kwok, Hoi-Sing; Li, Guijun. "A buried functional layer for inorganic CsPb<sub>0.75</sub>Sn<sub>0.25</sub>I<sub>2</sub>Br perovskite solar cells". *Solar RRL*, 6.4 (2022): 2100899.
33. Zhong, Wei; Zhang, Jianfeng; Liu, Yuan; Tan, Lijun; Lan, Linfeng; **Deng, Sunbin**; Yeung, Fion Sze Yan; Kwok, Hoi Sing; Chen, Rongsheng. "Gate Dielectric Treated by Self-Assembled Monolayers (SAMs) to Enhance the Performance of InSnZnO Thin-Film Transistors", *IEEE Transactions on Electron Devices*, 69.5 (2022): 2398-2403.
34. Shi, Weiwei; Hu, Lizhi; Liu, Yuan; **Deng, Sunbin**; Xu, Yuming; Kwok, Hoi-Sing; Chen, Rongsheng. "Arithmetic and Logic Circuits Based on ITO-Stabilized ZnO TFT for Transparent Electronics", *IEEE Transactions on Circuits and Systems I: Regular Papers*, 69.1 (2022): 356-365.
35. Xu, Yuming; Li, Bin; Zhong, Wei; **Deng, Sunbin**; Fan, Houbo; Wu, Zhaohui; Yeung, Fion Sze Yan; Kwok, Hoi Sing; Chen, Rongsheng. "A Unipolar TFT-Based Amplifier with Enhanced DC Offset Suppression", *Electronics Letters*, 57.2 (2021): 67-70.
36. Zhang, Jianfeng; Zhong, Wei; Liu, Yuan; Huang, Jincheng; **Deng, Sunbin**; Zhang, Meng; Kwok, Hoi-Sing; Li, Guijun. "A High-Performance Photodetector Based on 1D Perovskite Radial Heterostructure", *Advanced Optical Materials*, 9.24 (2021): 2101504.
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  2. **Deng, Sunbin**; Kwak, Jungyoun; Lee, Junmo; Chakraborty, Dyutimoy; Shin, Jaewon; Phadke, Omkar; Kirtania, Sharadindu Gopal; Zhang, Chengyang; Aabrar, Khandker Akif; Yu, Shimeng; Datta, Suman. "Demonstration of On-Chip Switched-Capacitor DC-DC Converters using BEOL Compatible Oxide Power Transistors and Superlattice MIM Capacitors", *2024 IEEE Symposium on VLSI Technology & Circuits*, Honolulu, USA, June 2024.
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  32. Xu, Yuming; Li, Bin; **Deng, Sunbin**; Zhong, Wei; Yin, Xuemei; Wu, Zhaohui; Kwok, Hoi-Sing; Chen, Rongsheng. "Frontend Amplifier with Unipolar Oxide TFTs for Heart Rate Measurements", *2022 International Conference on Display Technology*, Fuzhou, China, Oct. 2022.
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35. Zhang, Meng; Ma, Xiaotong; Jiang, Zhendong; **Deng, Sunbin**; Li, Guijun; Chen, Rongsheng; Yan, Yan; Wong, Man; Kwok, Hoi-Sing. "Light-Illumination-Induced Degradation and Its Long-Term Recovery in Indium-Tin-Zinc Oxide Thin-Film Transistors", *2019 IEEE 26<sup>th</sup> International Symposium on Physical and Failure Analysis of Integrated Circuits (IPFA)*, Hangzhou, China, July 2019.
  36. Zhang, Meng; Jiang, Zhendong; **Deng, Sunbin**; Ma, Xiaotong; Yan, Yan; Li, Guijun; Chen, Rongsheng; Wong, Man; Kwok, Hoi-Sing. "Gate-Bias-Stress-Induced Instability in Hybrid-Phase Microstructural ITO-Stabilized ZnO TFTs", *Society for Information Display's Display Week 2019*, San Jose, USA, May 2019.
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  40. Zhong, Wei; Li, Guoyuan; **Deng, Sunbin**; Yin, Xuemei; Lan, Linfeng; Chen, Rongsheng; Kwok, Hoi Sing. "Photoluminescence and Electrical Properties study of ITO-stabilized ZnO Thin-Film Transistors with different annealing temperatures", *2018 International Conference on Display Technology*, Guangzhou, China, Apr. 2018.
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- **Patents (3 issued, 3 to be issued)**
1. Chen, Rongsheng; **Deng, Sunbin**; Kwok Hoi -Sing. "Method for Manufacturing a Top-Gate Self-Aligned Indium-Tin-Zinc Oxide Thin-Film Transistor", United States Patent No.: US 11,049,881 B2, Issue Date: 2021 Jun 29.
  2. Chen, Rongsheng; **Deng, Sunbin**; Kwok Hoi -Sing. "Inorganic Metallic Oxide Thin Film with Composite Crystal Form and Manufacturing Method Thereof", United States Pub. No.: US 2020/0350167 A1, Pub. Date: Nov. 05, 2020.
  3. 一种自对准顶栅钼锡锌氧化物薄膜晶体管及其制造方法, 陈荣盛, **邓孙斌**, 郭海成, Chinese Invention Patent No.: ZL 201710792095.9, Issue Date: Oct. 11, 2019.
  4. 一种二硫化钼薄膜的制备方法, 陈荣盛, 钟伟, **邓孙斌**, 李国元, 吴朝晖, 李斌, Chinese Invention Patent

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6. 一种金属氧化物薄膜晶体管及其钝化层的制备方法, 陈荣盛, 钟伟, 邓孙斌, 尹雪梅, 郭海成, Chinese patent application No.: 2018 1 1405391.X, Pub. Date: Nov. 23, 2018.

## TECHNICAL SKILLS & QUALIFICATION

### ▪ Lab Skills

1. Skilled in nanofabrication techniques including, but not limited to, the following:
  - a) Film growth/deposition (sputtering, EBE, PLD, PECVD, ALD, thermal diffusion, implantation, etc.)
  - b) Lithography (photolithography, e-beam lithography, laser-interference lithography, etc.)
  - c) Dry/wet etching (RIE, ICP, DRIE, etc.) and chemical-mechanical polishing
2. Skilled in layout design (L-edit, Klayout, etc.), device characterizations (Keithley 4200A-SCS, Keysight B1500A, etc.), and data analysis
3. Experienced with material characterizations (XPS, UPS, XRD, SIMS, AFM, SEM, TEM, etc.)
4. Experienced with device modelling and circuit simulation toolkits (Silvaco TCAD, Cadence, etc.)

### ▪ Qualification

1. Grade II (C language) & Grade IV (Network Engineer), National Computer Rank Examination of China
2. Second-grade Referee, China Tennis Association

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